

Traffic Signals: When, Where and Why

Indiana Department of Transportation

Questions and Answers

Over the years, the Indiana Department of Transportation (INDOT) has heard thousands of questions regarding traffic signals. This brochure is an attempt to resolve some of those misunderstandings and answer some of the traffic signal questions we hear most frequently.

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What is the purpose of a traffic signal?

A traffic signal assigns the right of way at an intersection. When properly installed at a proper intersection, a signal provides several benefits:

- It moves traffic in an orderly way.
- It reduces the frequency of certain types of crashes, especially the right-angle type.
- It may be interconnected with other signals to provide nearly continuous movement of traffic at a definite speed.
- It may be used to interrupt heavy traffic at intervals to permit other traffic to cross.

When a signal is installed improperly or at the wrong location, it has the following disadvantages:

- It can cause excessive delay, which in turn increases driver aggravation and encourages motorists to disobey the signal indications.
- It may increase the frequency of certain types of crashes, especially the rear-end type.

A signal works primarily by stopping traffic. Anytime a car stops on a highway, the possibility exists that a following motorist will not notice the stopped vehicle until it is too late to avoid a crash.

We have seen that a traffic signal is not a cure-all. It may solve some problems at an intersection, but it may contribute to others. A signal at the wrong location can cause crashes or congestion, or both. For this reason, your safety requires that INDOT investigate each signal request carefully.

What rules do you follow?

The Indiana Manual on Uniform Traffic Control Devices governs the installation of traffic signals on all roads in the state. The manual, used by all state, county and local government agencies, is derived from a similar U.S. Manual to insure uniform applications throughout the country.

To qualify for a traffic signal, a location must meet one of two warrants. There are also six additional factors which should be considered as supplemental criteria. However the satisfaction of either the signal warrants or the supplemental criteria does not necessarily mean that a traffic signal will be installed.

Warrant Criteria

- Eight-hour Vehicle Volume:

Vehicular Volume "Warrant": Where the volume of intersecting traffic is the principal reason for signal consideration and minimum volumes are met on the major street and the higher-volume minor-street approach.

Interruption of Continuous Traffic "Warrant": Where the traffic volume on a major street is so heavy that traffic on a minor intersection street suffers excessive delay or hazard in entering or crossing.

- Pedestrian Volume "Warrant": Where there is a combination of heavy vehicular traffic and crosswalk volume.

Supplemental Criteria

- Four-hour vehicle volume: Where the volume of intersecting traffic reaches a particularly high threshold for four hours a day.
- Peak-hour: Where traffic conditions are such that for at least one hour a day the minor street traffic suffers undue delay when entering or crossing the major street.
- School Crossing: Where there are insufficient gaps in normal traffic during the time school children use the crossing.
- Coordinated Signal System: Where at carefully selected locations within an interconnected signal system, it is possible to group vehicles and regulate group speeds.
- Crash Experience: Where crashes have been reported that could be corrected by a signal.
- Roadway Network: Where two major routes intersect or where it is desirable to interconnect one signal system to another.

You may have noticed that traffic volumes play a large role in many of the "warrants". Experience has shown that if the volumes are below a certain value (which varies with the physical characteristics of the intersecting roads), the chances are that a signal would not help move traffic.

How do you decide if a signal is needed?

When a request for a signal is received:

- A traffic count is conducted at the intersection to determine if vehicle volumes meet required levels.
- INDOT reviews the types of crashes that have occurred at the intersection and whether that type can be corrected by a signal. Signals alone cannot prevent left-turn crashes. A traffic signal can only assign the right of way, it cannot guarantee it. A motorist must still use caution on entering an intersection even when the signal is green. The investigation may also indicate that other traffic control devices or road modifications would be better than a signal for reducing crashes. Among the other traffic controls which may be considered are: no parking zones, flashing beacons or stop signs.

A field study of the location is made by a traffic investigator. Statistics can be misleading, so after studying the traffic counts and crash records, the traffic investigator makes one or more field inspections to observe the physical characteristic of the intersection and behavior of the traffic. When necessary, the local police and other officials are also contacted to hear their first-hand account of the traffic conditions. Only then is an action recommended. If one or more criteria for a signal is met, a signal installation may be the recommended action. If it is not "warranted," the engineer must decide whether other traffic control devices or road modifications should be used, based on their own warrants. Under some circumstances other traffic control devices or road modifications may be made in addition to installing a traffic signal.

Who pays for a new traffic signal?

When a signal is installed at a state highway intersection, the state generally pays the entire cost. If an intersection is formed by a state highway and a local road, the local government agency may pay a portion of the cost or facilitate right-of-way acquisition in order to expedite installation.

In the case of a signal installed to service a private commercial or industrial establishment (such as a shopping center), the private interest pays the complete cost of installation and major maintenance.

But regardless who pays for it, INDOT's decision to install a signal is based on conditions and traffic flows at the intersection and not how much the signal will cost.

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